

We claim:

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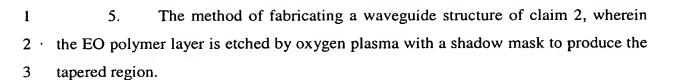
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	1.	A method of operably interconnecting an electrooptic (EO) polymer
waveguide and a passive polymer waveguide, comprising:		
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providing a tapered electrooptic (EO) polymer waveguide interconnection structure between an EO polymer waveguide and a passive polymer waveguide.

- A method of fabricating a waveguide structure, comprising:
 coating a passive polymer lower cladding over a substrate;
- coating a passive core layer lower portion over the passive polymer lower cladding;
- 5 curing the passive polymer lower cladding and the passive core layer lower 6 portion;
 - coating an electrooptic (EO) polymer layer over the passive core layer lower portion;
- 9 etching the EO polymer layer to produce a tapered EO polymer layer with a tapered region;
- 11 coating an passive core layer upper portion over the tapered EO polymer layer; 12 etching the tapered EO polymer layer to produce a rib waveguide structure; 13 and
- coating a passive polymer upper cladding over the rib waveguide structure.
- The method of fabricating a waveguide structure of claim 2, wherein the passive polymer lower cladding and the passive core layer lower portion are cured with ultraviolet (UV) light.
- 1 4. The method of fabricating a waveguide structure of claim 2, wherein 2 the passive polymer lower cladding and the passive core layer lower portion are cured 3 in a nitrogen environment.



- 1 6. The method of fabricating a waveguide structure of claim 5, wherein a 2 fixed radio frequency (RF) power and gas pressure are employed for etching the EO 3 polymer layer.
- The method of fabricating a waveguide structure of claim 5, wherein a width of a gap between the EO polymer layer and the shadow mask is selected to control a taper length of the tapered region.
- 1 8. The method of fabricating a waveguide structure of claim 2, wherein
 2 the tapered EO polymer layer is etched by:
 3 printing waveguide patterns over the tapered EO polymer layer; and
 4 employing an oxygen reactive ion etching process to produce the rib
 5 waveguide structure.
- 9. A waveguide structure, comprising:
 2 an electrooptic (EO) polymer waveguide;
 3 a passive polymer waveguide; and
- a tapered EO polymer waveguide interconnection structure between the EO polymer waveguide and the passive polymer waveguide.
- 1 10. The waveguide structure of claim 9, wherein the EO polymer 2 waveguide and the passive polymer waveguide provide single mode propagation, and 3 the interconnection structure provides a coupling between the two waveguides without 4 higher order mode coupling.
- 1 11. The waveguide structure of claim 9, wherein an interconnection loss 2 associated with the interconnection structure is less than 0.4 dB.

- 1 12. The waveguide structure of claim 9, wherein the interconnection
- 2 structure is vertically tapered.
- 13. The waveguide structure of claim 9, wherein a taper length of the
 interconnection structure is 300 μm or more.
- 1 14. The waveguide structure of claim 9, wherein a taper angle of the 2 interconnection structure is no greater than 0.4 degrees.
- 1 15. The waveguide structure of claim 9, wherein the EO polymer 2 waveguide and the passive polymer waveguide are formed as rib structures.
- 1 16. The waveguide structure of claim 9, wherein the EO polymer 2 waveguide has a higher refractive index that the passive polymer waveguide.
- 1 17. The waveguide structure of claim 9, wherein the passive polymer 2 waveguide has a larger mode profile than the EO polymer waveguide.
- 1 18. The waveguide structure of claim 9, wherein the EO polymer 2 waveguide comprises a nonlinear chromophore.
- 1 19. The waveguide structure of claim 18, wherein the nonlinear chromophore includes a tricyanobutadiene acceptor and a phenyltetraene bridge.
- 1 20. The waveguide structure of claim 9, wherein the passive polymer 2 waveguide comprises a fluorinated polymer.
- 1 21. The waveguide structure of claim 9, wherein the passive polymer 2 waveguide comprises a fluorinated acrylate.